

AD-A066 671

FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
GENERATOR OF POWERFUL CURRENT PULSES, (U)
JAN 78 F M SPEVAKOVA, A M STOLOV
FTD-ID(RS)T-0050-78

F/6 10/2

UNCLASSIFIED

NL

1 OF 1
AD
A066671



END
DATE
FILMED
5-79
DDC

AD-A066671

①

FTD-ID(RS)T-0050-78

FOREIGN TECHNOLOGY DIVISION



GENERATOR OF POWERFUL CURRENT PULSES

by

F. M. Spevakova, A. M. Stolov



Approved for public release;
distribution unlimited.

78 11 22 137

EDITED TRANSLATION

FTD-ID(RS)T-0050-78

24 January 1978

MICROFICHE NR: *AD-78-C-000179*

GENERATOR OF POWERFUL CURRENT PULSES

By: F. M. Spevakova, A. M. Stolov

English pages: 5

Source: USSR Patent No. 230282, 21 Mar 1969, pp. 1-2.

Country of origin: USSR

Translated by: Robert A. Potts

Requester: FTD/TQTD

Approved for public release; distribution unlimited.

ACCESSION for	
NTIS	White Section <input checked="" type="checkbox"/>
DDC	Ref Section <input type="checkbox"/>
UNANNOUNCED	<input type="checkbox"/>
JUSTIFICATION	
BY	
DISTRIBUTION/AVAILABILITY CODES	
REF	Avail and/or SPECIAL
<i>A</i>	

THIS TRANSLATION IS A RENDITION OF THE ORIGINAL FOREIGN TEXT WITHOUT ANY ANALYTICAL OR EDITORIAL COMMENT. STATEMENTS OR THEORIES ADVOCATED OR IMPLIED ARE THOSE OF THE SOURCE AND DO NOT NECESSARILY REFLECT THE POSITION OR OPINION OF THE FOREIGN TECHNOLOGY DIVISION.

PREPARED BY:

TRANSLATION DIVISION
FOREIGN TECHNOLOGY DIVISION
WP-AFB, OHIO.

U. S. BOARD ON GEOGRAPHIC NAMES TRANSLITERATION SYSTEM

Block	Italic	Transliteration	Block	Italic	Transliteration
А а	<i>А а</i>	A, a	Р р	<i>Р р</i>	R, r
Б б	<i>Б б</i>	B, b	С с	<i>С с</i>	S, s
В в	<i>В в</i>	V, v	Т т	<i>Т т</i>	T, t
Г г	<i>Г г</i>	G, g	У у	<i>У у</i>	U, u
Д д	<i>Д д</i>	D, d	Ф ф	<i>Ф ф</i>	F, f
Е е	<i>Е е</i>	Ye, ye; E, e*	Х х	<i>Х х</i>	Kh, kh
Ж ж	<i>Ж ж</i>	Zh, zh	Ц ц	<i>Ц ц</i>	Ts, ts
З з	<i>З з</i>	Z, z	Ч ч	<i>Ч ч</i>	Ch, ch
И и	<i>И и</i>	I, i	Ш ш	<i>Ш ш</i>	Sh, sh
Й й	<i>Й й</i>	Y, y	Щ щ	<i>Щ щ</i>	Shch, shch
К к	<i>К к</i>	K, k	Ъ ъ	<i>Ъ ъ</i>	"
Л л	<i>Л л</i>	L, l	Ы ы	<i>Ы ы</i>	Y, y
М м	<i>М м</i>	M, m	Ь ь	<i>Ь ь</i>	'
Н н	<i>Н н</i>	N, n	Э э	<i>Э э</i>	E, e
О о	<i>О о</i>	O, o	Ю ю	<i>Ю ю</i>	Yu, yu
П п	<i>П п</i>	P, p	Я я	<i>Я я</i>	Ya, ya

*ye initially, after vowels, and after ъ, ь; e elsewhere.
When written as ë in Russian, transliterate as yë or ë.

RUSSIAN AND ENGLISH TRIGONOMETRIC FUNCTIONS

Russian	English	Russian	English	Russian	English
sin	sin	sh	sinh	arc sh	sinh ⁻¹
cos	cos	ch	cosh	arc ch	cosh ⁻¹
tg	tan	th	tanh	arc th	tanh ⁻¹
ctg	cot	cth	coth	arc cth	coth ⁻¹
sec	sec	sch	sech	arc sch	sech ⁻¹
cosec	csc	csch	csch	arc csch	csch ⁻¹

Russian English

rot curl
lg log

0050

GENERATOR OF POWERFUL CURRENT PULSES.

F. M. Spevakova and A. M. Stolov.

The invention pertains to devices for the generation of powerful current pulses, for example, for installations with adiabatic compression of plasma in magnetic traps. In such installations is required rapid growth of magnetic field and maintaining the prescribed magnitude of field for a time substantially exceeding the duration of the pulse front.

Various methods are known for solving this problem, for example, with the aid of short-circuit shunting of inductive load with maximum current in it. However, this method is unsuitable when the time constant of the circuit of the

78 11 22 137

magnetic system is less than the required pulse duration.

In this case such a problem is solved with the application of a two-stage circuit.

The proposed generator of powerful current pulses is distinguished from those known by the fact that for providing rapid growth of current with subsequent maintaining of the current at a prescribed level, to the smoothing resistor and load through the second commutator is connected a shaping line, fed from a separate source, the voltage of which was selected so that relationship $E_2 = E_1 (1 + \rho/R)$ would be fulfilled, where E_2 - voltage of source, connected with line, E_1 - voltage of source, connected with capacitance accumulator, ρ - characteristic resistance of line, R - magnitude of smoothing resistance.

On the drawing is provided the schematic diagram of the generator.

The first stage of the generator contains the power supply source E_1 , which through charging resistor R_1 is connected is connected to capacitance accumulator C_0 . The last through commutator K_1 and smoothing resistor R is

connected to load L_0 .

Furthermore, there is a second stage, containing power source E_2 , charging resistor R_2 and a line, formed by elements L and C . The line through commutator K is connected to load L_0 and smoothing resistor R .

The generator operates in the following manner.

After charging of capacitors to voltage E_1 and E_2 there is switched on commutator K_1 , and current in the load rapidly rises. After reaching maximum value of current commutator K_2 is switched on, as a result of which the current is kept constant for a time determined by the parameters of the line.

The condition of constancy of current in this interval is $E_2 = E_1 (1 + \rho/R)$, where ρ - characteristic resistance of the line.

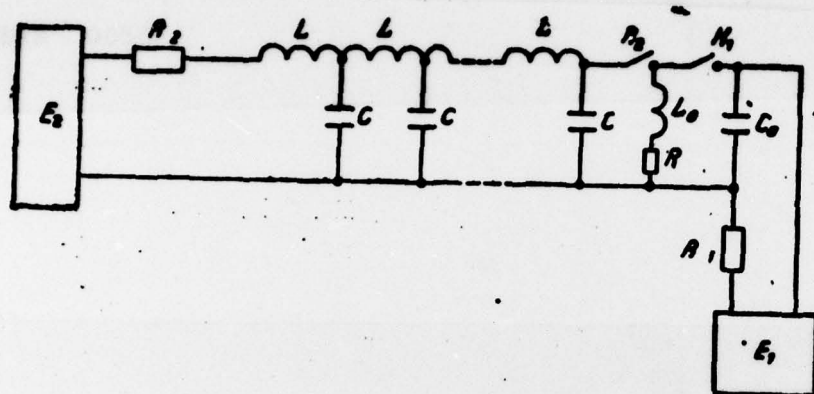
A distinguishing feature of the proposed circuit is the high use of energy of the system. The energy of capacitance accumulator C_0 almost completely converts into energy of the magnetic field, and the energy of the line

with $R = \rho$ is practically all consumed for covering the active losses in the load. As calculation shows, the energy utilization factor can reach up to 98 o/o.

SUBJECT OF INVENTION

Generator of powerful current pulses, containing a power source, connected through charging resistor to capacitance accumulator, which through commutator and smoothing resistor is connected to a load, is distinguished by the fact that for providing rapid growth of current with subsequent maintaining of current at a prescribed level, to the smoothing resistor and load through a second commutator is connected a shaping line, fed from a separate source, the voltage of which is selected so that relationship $E_2 = E_1 (1 + \rho/R)$ would be fulfilled, where E_2 - voltage of source connected with line, E_1 - voltage of source connected with capacitance accumulator, ρ - characteristic resistance of line, R - magnitude of smoothing resistance.

Figure.



DISTRIBUTION LIST

DISTRIBUTION DIRECT TO RECIPIENT

ORGANIZATION	MICROFICHE	ORGANIZATION	MICROFICHE
A205 DMATC	1	E053 AF/INAKA	1
A210 DMAAC	2	E017 AF/RDXTR-W	1
B344 DIA/RDS-3C	8	E404 AEDC	1
C043 USAMIA	1	E408 AFWL	1
C509 BALLISTIC RES LABS	1	E410 ADTC	1
C510 AIR MOBILITY R&D	1	E413 ESD	2
LAB/FIO		FTD	
C513 PICATINNY ARSENAL	1	CCN	1
C535 AVIATION SYS COMD	1	ETID	3
		NIA/PHS	1
C591 FSTC	5	NICD	5
C619 MIA REDSTONE	1		
D008 NISC	1		
H300 USAICE (USAREUR)	1		
P005 ERDA	1		
P055 CIA/CRS/ADD/SD	1		
NAVORDSTA (50L)	1		
NASA/KSI	1		
AFIT/LD	1		